

REMARKS

By this Amendment, the claims and specification have been amended to overcome the format objections and rejections under 35 U.S.C. 112, respectively. Claims 1-9 are pending.

Claims 1-9 have been rejected under 35 U.S.C. 102 as being allegedly anticipated by Yamasaki et al. (US 6,357,753; hereafter “Yamasaki”). Applicant traverses the rejection because Yamasaki fails to disclose, teach or suggest all the features recited in the rejected claims. For example, Yamasaki fails to disclose, teach or suggest the claimed arrangement, wherein “at least one of the first additional part arranged to transfer the rotation torque of at least one of the shaft and the second additional part receiving torque is a super elastic memory metal element arranged to bend within the limits of the reversible deformation of the material,” as recited in independent claim 1 and its dependent claims 2-9.

As explained in Applicant’s specification, a problem with conventional mechanical shaft seals is that additional parts transferring torque from the shaft of the device included in the shaft seal are subjected to wear or are broken at the points from which torque is transferred from one part to another, for instance to the sliding surface parts.

This same problem occurs for the parts intended to be non-rotating at points, from which the non-rotating parts are locked to the device or to a separate frame part. The torque caused by a frictional force formed between the plane surfaces of the non-rotating parts and the rotating parts in the mechanical shaft seal wears and breaks the additional parts. This is because the rotating motion of the device shaft is transferred to: (1) the rotating parts of the mechanical seal, or (2) those parts which tend to be used for preventing the rotating motion produced by the torque caused by the frictional force in the non-rotating parts of the mechanical shaft seal.

This phenomenon causes the mechanical shaft seal to be prematurely damaged in such a manner that the mechanical seal no longer operates as intended, i.e., to seal the gap between the rotating shaft and the static parts of the device. Further, in conventional mechanical shaft seals, the torque causes the sliding surfaces of the sliding surface parts in the mechanical seal to deform so that the mechanical seal no longer operates as intended.

To the contrary, the present invention addresses the above described conventional deficiency by forming constituent parts of the mechanical shaft seal from super elastic memory metal elements, which are arranged to bend within the limits of the reversible deformation of that

material. Such memory metals provide super elasticity of the material, which can provide a much larger reversible deformation compared with other common metals when the metal is placed under the influence of torque.

To the contrary, in Yamasaki, cylindrical holder 21 (allegedly corresponding to the claimed second additional part) and rear end portion 40 (allegedly corresponding to the claimed first additional part) are disclosed as being made of titanium; however, Yamasaki fails to teach or suggest that those parts, or their material (titanium), may or should have super elastic memory metal characteristics. Furthermore, Yamasaki fails to teach or suggest that the cylindrical holder 21 or the rear end portion 30 are arranged to transfer torque of the rotating parts in the mechanical shaft seal.

In fact, the selection of titanium for components 21 and 40 in Yamasaki would be understood by one of ordinary skill in the art as a selection based on the good strength characteristics of titanium. Thus, Yamasaki fails to teach or suggest any motivation for modifying the material of these components to be a super elastic memory metal. Accordingly, Yamasaki fails to disclose, teach or suggest the claimed arrangement, wherein “at least one of the first additional part arranged to transfer the rotation torque of at least one of the shaft and the second additional part receiving torque is a super elastic memory metal element arranged to bend within the limits of the reversible deformation of the material,” as recited in independent claim 1 and its dependent claims 2-9.

Therefore, claims 1-9 are patentable over Yamasaki and the rejection must be withdrawn.

For all of the above reasons, withdrawal of the rejection of the pending claims is respectfully requested. In view of the above, it is submitted that all of the pending claims are in condition for allowance and such action is respectfully requested. If there is any issue remaining to be resolved, the examiner is invited to telephone the undersigned at (202) 371-6371 so that resolution can be promptly effected.

It is requested that, if necessary to effect a timely response, this paper be considered a Petition for an Extension of Time sufficient to effect a timely response with the fee for such extensions and shortages in other fees, being charged, or any overpayment in fees being credited, to the Account of Barnes & Thornburg LLP, Deposit Account No. **10-0435** (44655-356508).

Respectfully submitted,
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